

Amendments to the Claims

Claims 1-47 (Cancelled).

AA 5 48. (Currently Amended) A method for creating an emitter having a flat cathode emission surface, comprising the steps of:

forming a protective layer that is conductive on the flat cathode emission surface;

then creating an electronic lens structure over the protective layer; and

10 then etching the protective layer to expose the flat cathode emission surface.

49. (Original) An emitter created by the process of claim 48.

15 50. (Original) The method of claim 48 wherein the step of applying the protective layer further comprises the step of applying a layer of titanium or molybdenum to a thickness of about 300 to about 1500 Angstroms.

20 51. (Currently Amended) The method of claim 48 further comprising the step of applying a cathode layer on a flat tunneling layer disposed over an electron supply to create the flat cathode emission surface, the cathode layer including gold or platinum.

25 52. (Currently Amended) ~~The method of claim 48~~ A method for creating an emitter having a cathode emission surface, comprising the steps of:

forming a protective layer that is conductive on the cathode emission surface;

creating an electronic lens structure over the protective layer wherein the electronic lens structure includes a spacer layer;

30 ~~further comprising the step of etching the spacer layer before etching the protective layer;~~ and then

etching the protective layer to expose the cathode emission surface;
wherein the spacer layer etch rate and the protective layer etch rate have an etch selectivity greater than or equal to about 10:1.

53. (Original) The method of claim 48 wherein the protective layer is etched with sulfuric peroxide or ammonia and water to create the exposed cathode emission surface.

54. (Original) The method of claim 53 wherein the sulfuric peroxide etch is performed using about 1 part H₂O and about 2 parts H₂SO₄.

55. (Currently Amended) A method for creating an flat tunneling emitter on an electron supply, comprising the steps of:

applying a tunneling layer on the electron supply;

then applying a flat cathode layer on the tunneling layer;

then applying a protective layer that is conductive on the flat cathode layer;

then applying an electron lens structure on the protective layer; and

then creating an opening in the electron lens structure and protective layer to the flat cathode ~~surface~~ layer.

56. (Original) An emitter created by the process of claim 55.

57. (Original) The method of claim 55 wherein the applied protective layer is titanium or molybdenum having a thickness of about 300 to about 1500 Angstroms.

58. (Currently Amended) ~~The method of claim 55 further comprising the step of A~~
method for creating an emitter on an electron supply, comprising the steps of:

applying a tunneling layer on the electron supply;

applying a cathode layer on the tunneling layer;

applying a protective layer that is conductive on the cathode layer;

applying an electron lens structure on the protective layer by creating the
electron lens on the protective layer with a layer of tetraethylorthosilicate (TEOS), silicon oxides, silicon nitrides, or combinations thereof;
creating an opening in the electron lens structure and protective layer to the
cathode surface.

59. (Original) The method of claim 58 wherein the step of creating an opening further comprises the step of etching the TEOS layer before etching the protective layer and wherein the TEOS layer etch rate and the protective layer etch rate have an etch selectivity of at least about 10:1.

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60. (Original) The method of claim 59 further comprising the step of etching the protective layer after etching the TEOS layer with sulfuric peroxide to create the opening to the cathode surface.

10 61. (Original) The method of claim 60 wherein the sulfuric peroxide etch is performed using about 1 part H₂O and about 2 parts H₂SO₄.

62. (Original) A method for creating an emitter, comprising the steps of:

creating a tunneling layer over an electron supply surface;

15 applying a cathode layer over the tunneling layer;

applying a first protective layer on the cathode layer;

applying a first conductive layer on the first protective layer;

applying a second protective layer on the first conductive layer;

applying a spacer layer on the second protective layer;

20 applying a second conductive layer on the spacer layer;

creating an opening between the second conductive layer and the second protective layer;

etching the second protective layer to the first conductive layer;

etching the first conductive layer to the protective layer; and

25 etching the first protective layer to the cathode layer.

63. (Original) An emitter created by the process of claim 62.

64. (Original) The method of claim 62 wherein at least one of the applied first and
30 second protective layers is titanium or molybdenum.

65. (Original) The method of claim 62 wherein the spacer layer is tetraethylorthosilicate, silicon oxides, silicon nitrides, or combinations thereof.

66. (Original) The method of claim 62, further comprising the step of depositing polysilicon to create the electron supply surface.

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conceded 5 67. (Original) The method of claim 62 wherein the step of creating an opening further comprises the step of etching the spacer layer before etching the second protective layer and wherein the spacer layer etch rate and the second protective layer etch rate have an etch selectivity of at least about 10:1.

10 68. (Original) The method of claim 62 wherein the first protective layer is etched with sulfuric peroxide to create the exposed cathode emission surface.

69. (Original) The method of claim 68 wherein the sulfuric peroxide etch is performed using about 1 part H₂O and about 2 parts H₂SO₄.
